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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* STEVEN D. BUSH

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Appeal 2009-015299  
Application 10/759,970  
Technology Center 1700

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Before ADRIENE LEPIANE HANLON, BEVERLY A. FRANKLIN, and  
KAREN M. HASTINGS, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant seeks our review under 35 U.S.C. § 134(a) of the Examiner's final decision rejecting claims 21-36. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

#### A. STATEMENT OF THE CASE

Appellant's claimed subject matter relates to a dip-coating method for controlling the uniform thickness of coating formed from immersion, or dip-coating, of photoreceptors (Spec. 1:4-8). Claim 21 is illustrative:

21. A method of manufacturing a photoreceptor comprising:

pumping a charge transfer layer ("CTL") solution into a tube via a CTL solution inlet in the tube, the CTL solution having an initial viscosity, the tube having an upper opening positioned above the CTL solution inlet in the tube and sized to receive a substrate therethrough, the upper opening being configured to act as a solution outlet for the tube, the CTL solution being pumped through the tube from the CTL solution inlet to the CTL solution outlet at an initial pump speed selected to generate a predetermined vertical flow rate of the CTL solution in the tube;

inserting the substrate through the upper opening and at least partially submerging the substrate in the CTL solution in the tube;

withdrawing the substrate from the tube at a predetermined pull rate as the CTL solution is pumped through the tube at the predetermined vertical flow rate,

the predetermined pull rate and the predetermined vertical flow rate being selected in accordance with the initial viscosity of the CTL solution to provide a differential rate that enables a CTL coating to be deposited on the substrate at a target thickness;

measuring a viscosity of the CTL solution as the substrate is being withdrawn from the tube; and

adjusting the initial pump speed to generate an adjusted vertical flow rate of the CTL solution in the tube in response to deviations of the measured viscosity from the initial viscosity as the substrate is being withdrawn from the tube, the adjusted vertical flow rate being selected in accordance with a magnitude of the deviations and the predetermined pull rate to provide an adjusted differential rate to maintain the target thickness of the CTL coating on the substrate as the substrate is withdrawn from the tube.

The Examiner relies upon the following prior art references in the rejections of the appealed claims:

Langlois	5,149,612	Sept. 22, 1992
Mistrater	5,681,391	Oct. 28, 1997
Cai	6,270,850 B1	Aug. 7, 2001
Pinsly	6,180,310 B1	Jan. 30, 2001

The Examiner rejected, and Appellant appeals, the following rejections under 35 U.S.C. § 103(a):

claims 21 and 24-30 as unpatentable over Mistrater in view of Pinsly and Cai; and

claims 22-23 and 31-36 as unpatentable over the combined prior art of Mistrater, Pinsly, Cai, and Langlois.

Appellant does not separately argue with any reasonable specificity any of the individual dependent claims, including those separately rejected (App. Br. 11-15, Reply Br. 2-5). Appellant mainly focuses the arguments on claim 21. Accordingly, we likewise focus on independent claim 21 to decide the issues on appeal.

## B. MAIN ISSUE ON APPEAL

Did the Examiner reversibly err in determining that the method of manufacturing a photoreceptor as recited in claim 21 was obvious under 35 U.S.C. § 103(a) over the combined prior art of Mistrater, Pinsly, and Cai, because, as Appellant alleges, Pinsly does not does not teach that variations in coating thickness are directly related to variations in viscosity (App. Br. 11) and that “nothing in either [Cai or Pinsly] . . . teaches or suggests the monitoring of one coating characteristic and adjusting another coating characteristic to compensate for a change in the first coating characteristic” (App. Br. 14)?

We answer this question in the negative.

## C. PRINCIPLES OF LAW

In assessing whether a claim to a combination of prior art elements or steps would have been obvious, the question to be asked is whether the improvement of the claim is more than the predictable use of prior art elements or steps according to their established functions. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). The analysis need not seek out precise teachings directed to the specific subject matter of the claim, for it is proper to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. *Id.* at 418.

“For obviousness under § 103, all that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988).

Arguments and conclusions unsupported by factual evidence carry no evidentiary weight. *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984); *In re Lindner*, 457 F.2d 506, 508 (CCPA 1972). Without supporting evidence,

arguments and conclusory statements by the inventor cannot establish patentability. *In re De Blauwe, supra*; *In re Swan Wood*, 582 F.2d 638, 642 (CCPA 1978).

#### D. ANALYSIS

We have thoroughly reviewed each of Appellant's arguments for patentability. However, we are in agreement with the Examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art.

Specifically, we agree with the Examiner that it would have been obvious to one of ordinary skill in the art to have modified Mistrater and altered the relative coating speed, i.e., adjusted the pumping speed, due to the sensed viscosity because Pinsly exemplifies that viscosity changes throughout the coating process result in variations in coating thickness, and Cai discloses that the coating speed and viscosity are directly related to the coating thickness. (*See e.g.*, Ans. 3-6). We add the following primarily for emphasis.

Appellant's argument that Pinsly does not teach that variations in coating thickness are directly related to variations in viscosity (*e.g.*, App. Br. 11) is unconvincing for the reasons explained by the Examiner (Ans. 11). Notably, contrary to Appellant's assertion, the Examiner's finding of fact is directly supported by Pinsly:

Variations in charge transport layer coating solution viscosity while coating, sudden and small charge transport layer coating solution flow rate changes, among other mechanisms, cause variations in coating material thickness.

(Pinsly, col. 2, ll. 5-11)

Appellant argues that Pinsly does not teach that viscosity can be manipulated to control a coating thickness uniformly (App. Br. 12). We disagree and concur with the detailed findings of the Examiner (*see e.g.*, Ans. 12-13). Notably, the improved coating process disclosed in Pinsly was intended to “provide[] improved . . . coating thickness uniformity” (Pinsly col. 3, lines 14-15) and “minimize[] large fluctuations in viscosity and the variation of thickness of the deposited coating . . . .” (Ans. 13; *see also*, Pinsly col. 7, lines 54-63). Indeed, one of ordinary skill in the art would have fully appreciated that viscosity changes affect coating thickness from both Mistrater and Cai, as well as from many everyday experiences (*e.g.*, painting, dipping food in sauces).<sup>1</sup>

Appellant’s argument that Pinsly teaches away from any useful purpose for varying the flow rate of the coating solution (App. Br. 12) is unavailing for reasons aptly explained by the Examiner (*see* Ans. 15). It is well established that when determining if a reference teaches away from an invention, all of the teachings of the reference must be considered in totality. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550–51, (Fed. Cir. 1983), cert. denied, 469 U.S. 851, (1984); *see also In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (providing that teaching away is a significant factor, but the nature of the teaching is highly relevant, and must be weighed in substance).

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<sup>1</sup> *See, e.g., Leapfrog Enter., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) (“[a]n obviousness determination is not the result of a rigid formula disassociated from the consideration of the facts of a case. Indeed, the common sense of those skilled in the art demonstrates why some combinations would have been obvious where others would not.”)

Appellant argues that “nothing in either [Cai or Pinsly] . . . teaches or suggests the monitoring of one coating characteristic and adjusting another coating characteristic to compensate for a change in the first coating characteristic” (App. Br. 14). Appellant also argues that “[n]o corresponding change in viscosity is disclosed [in Cai] . . . so Cai is not teaching that coating solution speed changes are related to viscosity changes or *vice versa*” (*id.* at lines 1-3). These arguments are not persuasive of any error in the Examiner’s rejection. Cai discloses a mathematical equation, which Appellant concedes is a well known formula in the art (*id.* at 13). The equation in Cai directly relates coating speed, coat thickness, solution viscosity, and density (Cai, col. 4, lines 29-43). As the Examiner states:

Cai explicitly discloses that the coating thickness is directly related to the product of viscosity and the coating speed. One of ordinary skill in the art would understand that if the viscosity changes during the coating thickness the product of the viscosity and the coating speed can be maintained constant by (1) adjusting the viscosity and/or (2) adjusting the coating speed and therefore adjusting the coating speed in response to the change in viscosity (as taught by Pinsly) would have been obvious to one of ordinary skill in the art to provide predictable results of obtaining a uniform coating thickness.

(Ans. 16)

Appellant has not convinced us of any error in the Examiner’s reasonable conclusion that adjusting the pumping speed in response to the viscosity to maintain a constant coating thickness would have led to predictable results because a predictable use of prior art elements according to their established functions is *prima facie* obvious (*id.* at lines 15-19; *see also* Ans. 16).



Appellant's additional arguments in the briefs are unavailing because they improperly focus on the teachings of references individually instead of addressing the Examiner's stated case for obviousness (*generally* App. Br.; Reply Br.). "[O]ne cannot show non-obviousness by attacking references individually where . . . the rejections are based on combinations of references." *In re Keller*, 642 F.2d 413, 426 (CCPA 1981).

In sum, Appellant has not persuaded us that the Examiner erred in concluding that it would have been *prima facie* obvious for one of ordinary skill in the art, using no more than ordinary creativity, to have modified the dip-coating procedure disclosed by Mistrater by measuring the viscosity of the solution, as exemplified to be known by Pinsly, and adjusting the pumping speed accordingly because Cai discloses that both of these variables effect the coating thickness uniformity. Modification of one variable (pumping speed) in response to a variation in the other (viscosity) to achieve a target coat thickness is well within the scope of one of ordinary skill in the art.

Accordingly, Appellant has not shown reversible error in the Examiner's determination that the subject matter of independent claim 21 (nor any of the not separately argued claims) would have been *prima facie* obvious over the combined teachings of the applied prior art references.

#### E. DECISION

For the reasons stated above and in the Answer, we sustain the § 103 rejections of all of the appealed claims<sup>2</sup>.

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<sup>2</sup> Only those arguments actually made by Appellant have been considered in this decision. Arguments which could have been made but that Appellant chose not to make have not been considered and are deemed to be waived. See 37 C.F.R. § 41.37(c)(1)(vii) (2008).

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The decision of the Examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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